

We Claim:

1. A sheet processing machine in which sheets with leading edges and with trailing edges travel along a conveying path, comprising:

first grippers disposed to grip the leading edges of the sheets and to slave the sheets along a conveying section with positive guidance of the leading edges;

second grippers disposed to guide the trailing edges of the sheets and configured to be selectively opened;

a sheet decurler operatively associated with the conveying section;

a gripper opener configured to open said second grippers guiding the trailing edges of the sheets when the sheets reach said sheet decurler; and

a sheet guide device for aligning the trailing edges of the sheets leaving said sheet decurler for renewed gripping by said second grippers.

2. The machine according to claim 1, wherein said sheet guide device includes:

a sheet guide surface running at a distance from a gripper path defined by said grippers;

nozzles opening into said sheet guide surface for discharging a sheet carrying air stream; and

a pressurized air supply system for producing the sheet carrying air stream.

3. The machine according to claim 1, wherein said sheet guide device includes guide surface strips running along a section of a gripper path defined by said first and second grippers, supporting the sheets along the section of the gripper path, and forming clearances for said grippers traveling along a circulating path.

4. The machine according to claim 3, wherein said guide surface strips form a part of a suction chamber formed with suction openings facing the gripper path and communicating with an interior of said suction chamber, and wherein said suction chamber is fluidically connectible to a vacuum source.

5. The machine according to claim 3, wherein said guide surface strips define a course with at least one elevation and at least one depression.

6. The machine according to claim 1, which further comprises a sheet guidance device extending from said sheet decurler upstream with respect to the conveying direction.

7. In a sheet-processing machine in which sheets with leading edges and trailing edges are transported along a conveying direction, a method of decurling a sheet, which comprises:

prior to decurling a sheet, guiding the sheet with first grippers at a leading edge of the sheet and guiding the sheet with second grippers at the trailing edge of the sheet;

releasing the trailing edge from the second grippers and decurling the sheet;

subsequently aligning the sheet and gripping the trailing edge of the sheet with the second grippers.

8. A method of decurling a sheet, which comprises:

transporting the sheet through the sheet-processing machine according to claim 1, and thereby holding the leading edge of the sheet with the first grippers and holding the trailing edge of the sheet with the second grippers;

temporarily releasing the trailing edge from the second grippers and decurling the sheet with the sheet decurler; and

subsequently gripping the trailing edge of the sheet with the second grippers.